Section 6-6: Graph Quadratic Functions

By the end of this lesson, you should be able to answer:

- How do you identify points given the graph of a quadratic function?
- How do you graph simple quadratic functions?

Where you might see this in the real world:

- Sports, physics, agriculture

Define the following terms:

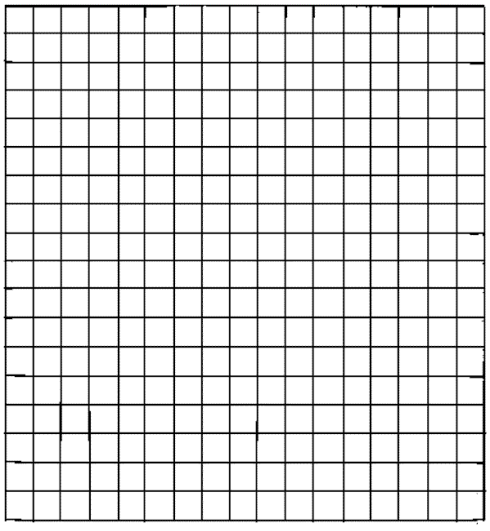
1. Quadratic function

All of the equations we have seen up to this point have given graphs that are either lines or part of lines. All of those equations have had x-variables to the power of 1. But what happens when the x-variables are squared?

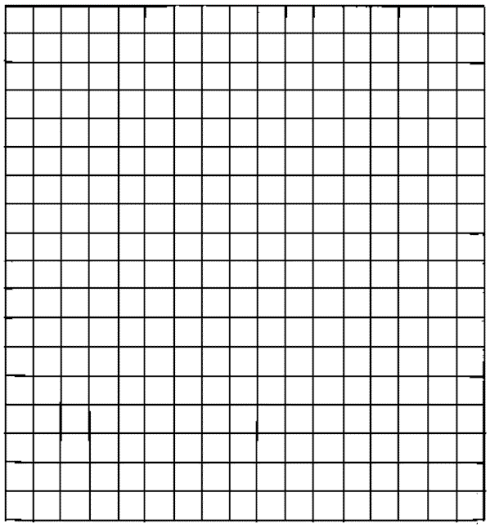
We get what is called a quadratic function, which is an equation of the form $y = ax^2 + bx + c$. a, b, and c are just variables that can represent any number, and $a \neq 0$. If $a = 0$, then the x^2 part drops out and it would no longer be a quadratic. Also, when looking for the a-value, it will always be with the x^2, the b-value will always be with x, and the c-value will be the number by itself.

All quadratics will give us the graph of a parabola. A parabola is a U-shaped curve that has a vertex. On either side of the vertex, the parabola will be symmetrical. As we are trying to graph a parabola, we need to make sure we find the vertex so we can graph the entire curve.

Example 1: Make a table and graph $y = x^2 + 2$.

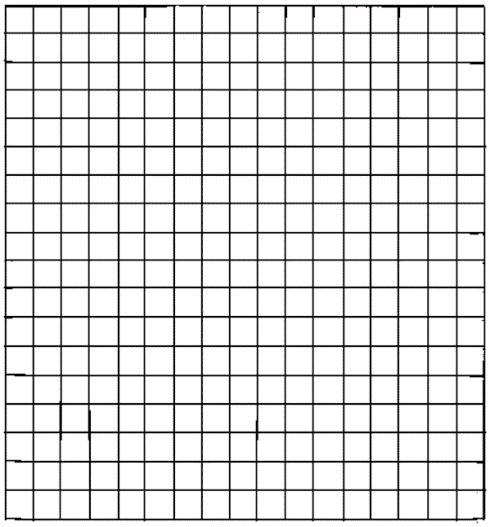


Example 2: Graph $y = 2x^2 + 3x - 7$. Then state the domain and range.



Example 3: A stationary supply wholesale chain found that pens that sell for x dollars have a profit y in thousands of dollars, modeled by the equation $y = -x^2 + 8x - 4$.

a. Make a table and draw a graph.

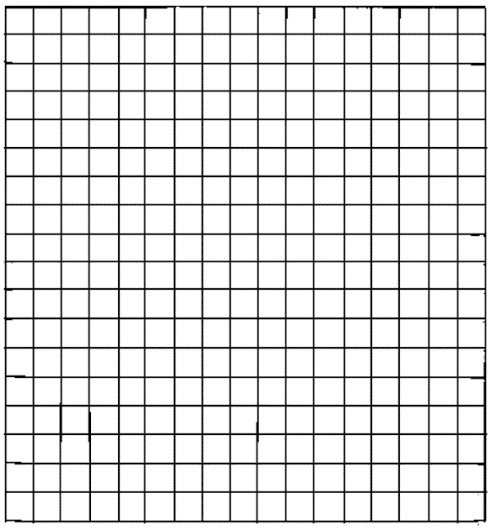


b. If the pens sell for $2.00 each, what is the expected profit?

c. What is the price of the pens that would yield the maximum profit? What is the maximum profit?

Example 4: Consider the equation $x = y^2$, which is the equivalent to the two equations $y = \pm\sqrt{x}$.

a. Make a table and graph.



b. Is this a function? How do you know?

c. What are the domain and range of the equation?

Homework:

"In theory, there is no difference between theory and practice. In practice there is."
- Yogi Berra